

# Greening Building Regulations City of Scottsdale

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Scottsdale Green Building Program



# Green Building Instruments

## Rating Systems

LEED  
Energy Star  
Green Globes  
NAHB  
Local GB Programs



## Standards

ASTM  
ASHRAE  
Green Seal  
GreenGuard  
Local Std's



## Codes & Ordinances

IBC  
IMC  
IECC  
Local Ord's



# National Green Rating Systems

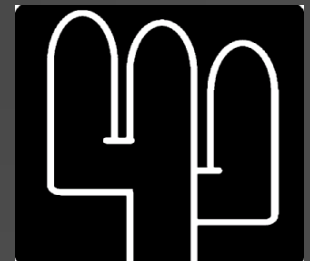
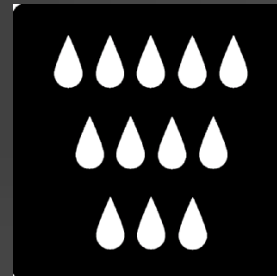
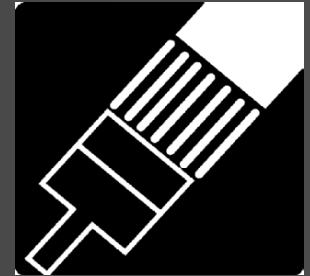
- US Green Building Council – LEED™
  - Commercial
    - New construction, Existing Buildings, Commercial Interiors, Core & Shell
  - LEED for Homes
  - Neighborhood Development



LEED.  
for HOMES

# Rating Categories by Environmental Impacts

- Site Use
- Energy
- Building Materials
- Indoor Air Quality
- Water
- Solid Waste



# Rating by Construction Categories

1. Site Use
2. Structural Elements
3. Building Envelope
4. HVAC & Indoor Air Quality
5. Electrical Power, Lighting & Appliances
6. Plumbing System
7. Roofing
8. Exterior Finishes
9. Interior Finishes
10. Interior Doors, Cabinetry, Trim
11. Finish Floor
12. Solid Waste
13. Innovative Design



# Green Building Program

## Sustainable Building in the Sonoran Desert

- Climatic and geographic characteristics are unique to the region.
- Utilization of local resources such as solar for energy and daylighting.
- Regional materials.





# Green Building Program

- Voluntary participation
- Qualification criteria
- Oversight by Green Building Advisory Committee
  - program criteria, education, outreach



# Incentives

- Expedited review & process assistance
- Market differentiation for builders & designers (directory and signs)
- Promotion material, education & public events

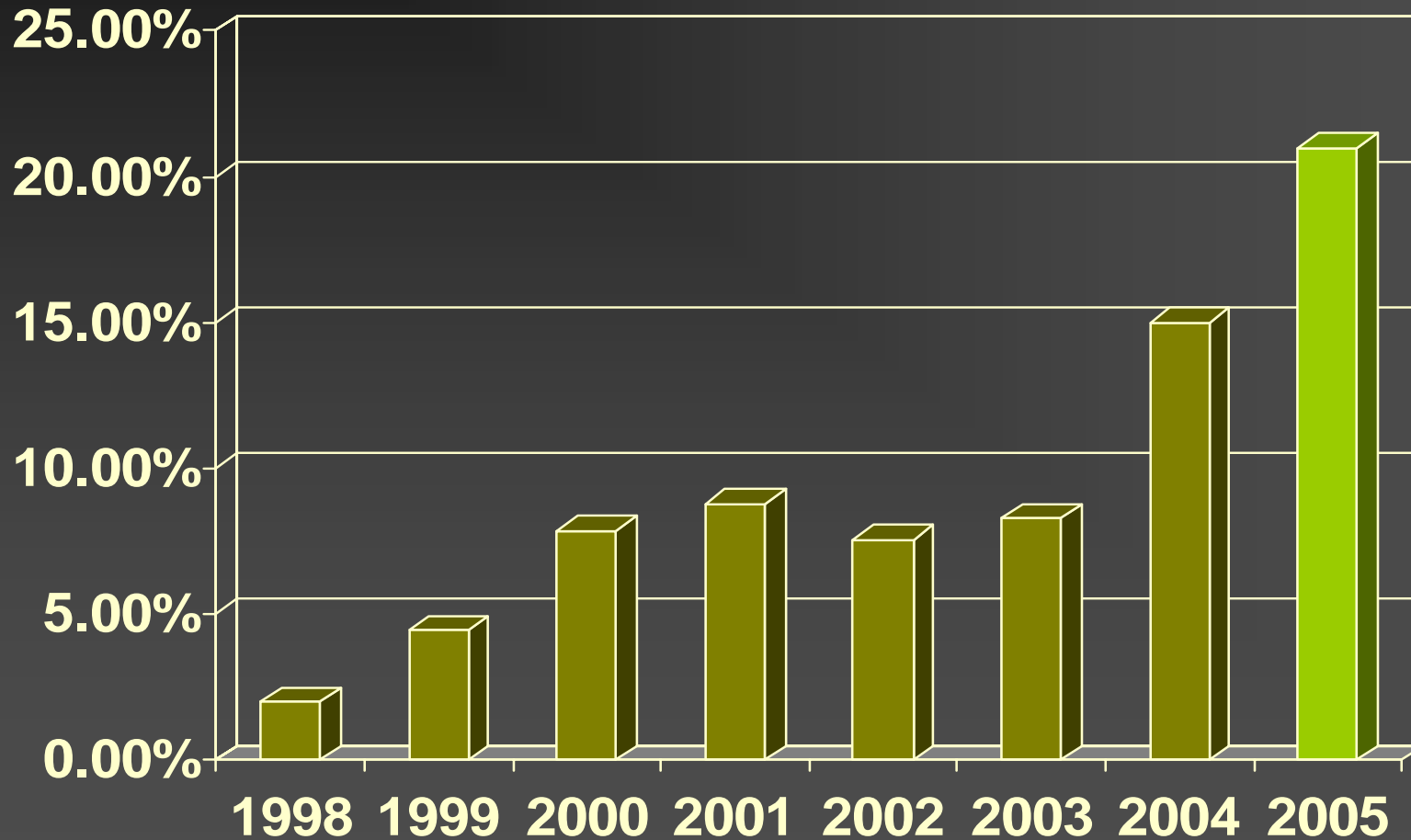




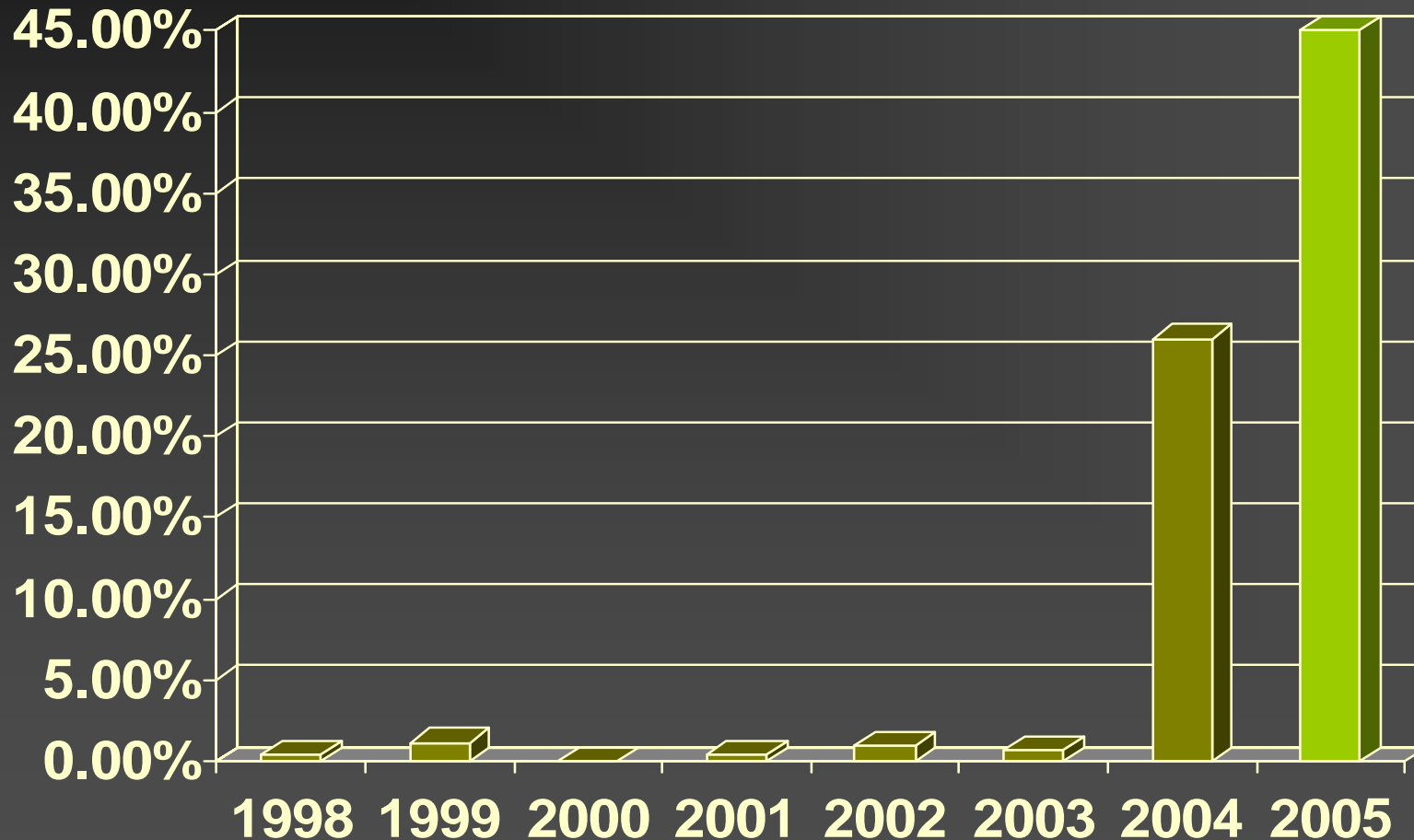
# Green Permit Activity

- In 2005
  - 33% of all new single-family residential permits were green (436 permits)
  - 97 participating builders
- 1998 to 2005
  - 932 green permits have been issued

# Green Custom Home Permits



# Green Production Home Permits





# Integration with Development Process

- Planning and Development
  - Development Review
  - Plan Review and Inspections
- Building and Energy Codes
  - International Building Codes
  - International Energy Conservation Code

# Green Building and the Building Permit Process



- Project qualification meeting
- Plan review submittal
- Green Building Permit
- Inspections
- Green Certificate of Occupancy



# Project Qualification

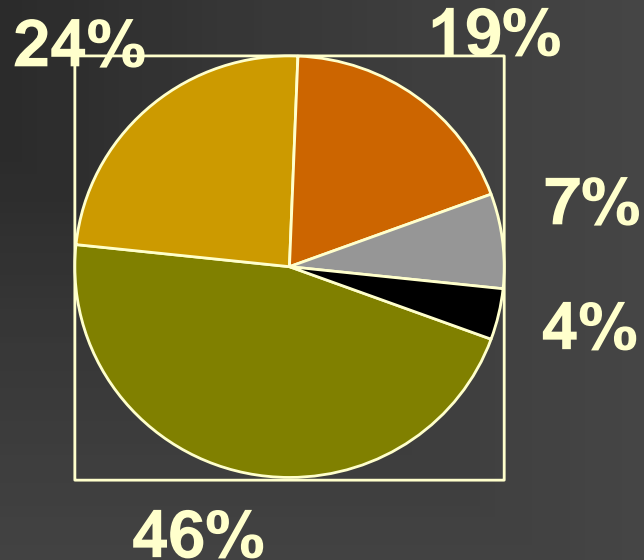
- Mandatory Items (28 requirements)
- Rating Options
  - 135 total options with 270 max. possible points
- Rating Levels
  - Entry Level – 50 to 100 points
  - Advanced Level – 100 – 200 points
  - Exemplary – 200 or more

# Rating Categories

Organized by Construction

1. Site
2. Structural Elements
3. Thermal Envelope
4. HVAC & Indoor Air Quality
5. Electrical Power, Lighting & Appliances
6. Plumbing System
7. Roofing
8. Exterior Finishes
9. Interior Finishes
10. Interior Doors, Cabinetry, Trim
11. Finish Floor
12. Solid Waste
13. Innovative Design

# Green Rating By Environmental Impact Areas



■ Energy Efficiency  
■ Indoor Envir. Quality  
■ Site Use

■ Resource Conservation  
■ Water Conservation



# Green Building and Codes

## Green Design

## Codes

Energy

Energy Code

Indoor Environmental Quality

Mechanical Code

Materials

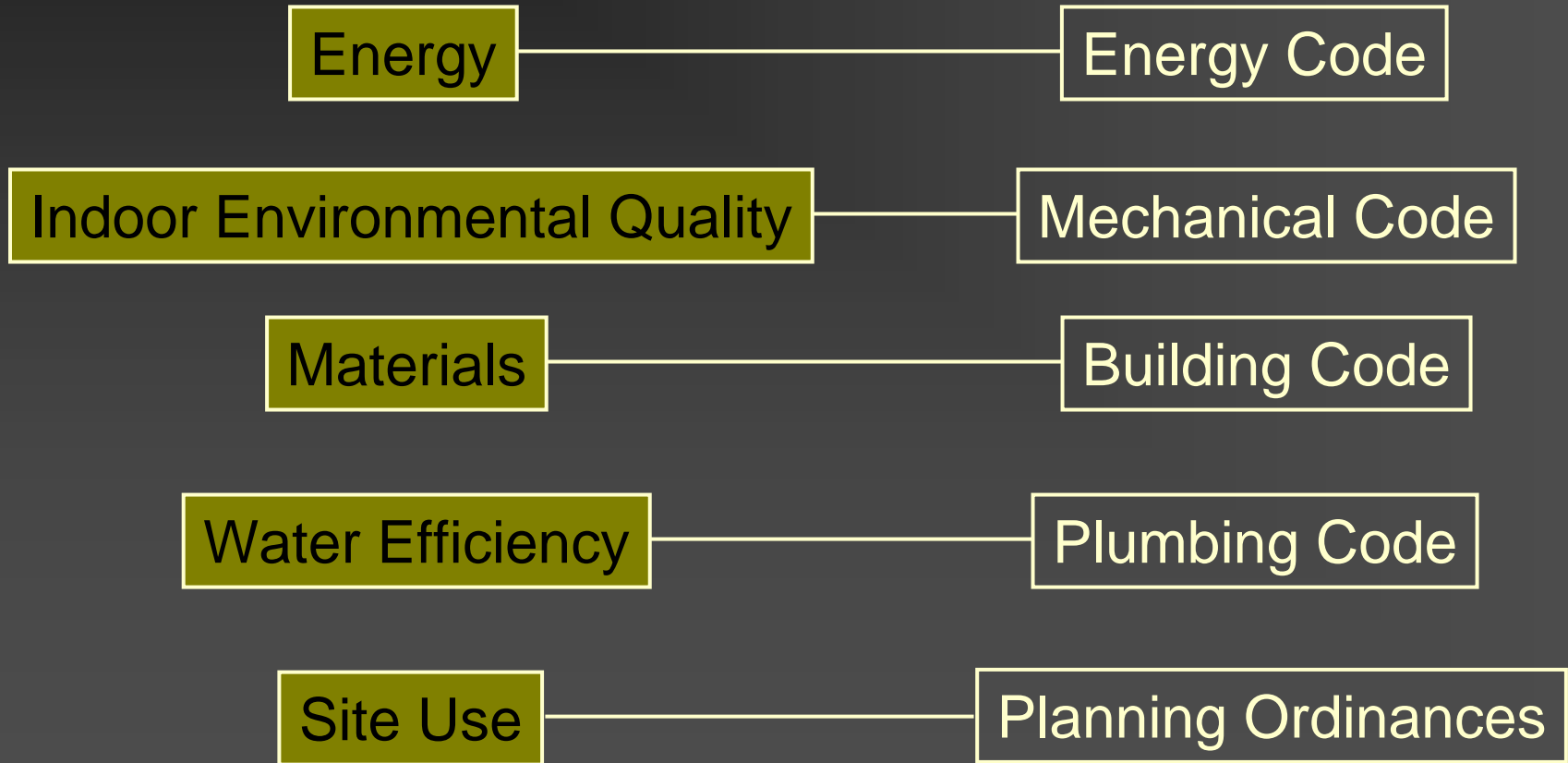
Building Code

Water Efficiency

Plumbing Code

Site Use

Planning Ordinances





# Plan Review Process

- Project Qualification
  - preliminary review
  - enrollment & rating checklist
  - log-in for tracking green projects
- Plan Review
  - approval of construction documents
  - green building inspection card
  - green certificate of compliance



# Inspection/Verification Process

- Green Permit
- Building Inspections
  - 17 mandatory and 0 - 50 selected options
- Self-Certified
  - 7 mandatory and 0 - 60 selected options
- Green Certificate of Occupancy
  - Certificate of Compliance at final inspection

**SCOTTSDALE****GREEN BUILDING  
PROGRAM**

City of Scottsdale

**Green Building Rating Checklist**Residential – New Construction, Major Remodels & Additions**Sept. 1, 2006 - Update**

Plan Check # \_\_\_\_\_ Building Permit # \_\_\_\_\_ GB Total Points \_\_\_\_\_

Project or Owner's Name - \_\_\_\_\_

Project Address - \_\_\_\_\_

Designer Name - \_\_\_\_\_

Builder Name - \_\_\_\_\_

Use this rating worksheet to qualify projects under the Green Building Program for one- and two-family dwellings and multiple single-family dwellings (townhouses and condominiums) not more than three stories in height with a separate means of egress (International Residential Code - IRC Section R101.2).

All building system components, materials, and equipment must be installed per code and manufacturer's instructions.

<u>Entry Level</u>	<u>Advanced Level</u>
<ul style="list-style-type: none"> <li>Meet all mandatory measures and adjust rating for house size (p. 2 – 7).</li> <li>Accumulate <u>50 - 99 points</u> from the rating checklist (p. 8 –26).</li> </ul>	<ul style="list-style-type: none"> <li>Meet all mandatory measures and adjust rating for house size (p. 2 – 7).</li> <li>Accumulate <u>100 or more points</u> from the rating checklist (p. 8 – 26).</li> </ul>

<u>Summary of Rating Categories</u>		
1. Site	6. Electrical Power, Lighting, Appliances	11. Interior Doors, Cabinetry, Trim
2. Structural Elements	7. Plumbing System	12. Flooring
3. Energy Rating/Performance	8. Roofing	13. Solid Waste
4. Thermal Envelope	9. Exterior Finishes	14. Innovative Design
5. Heating, Ventilation, & Air Conditioning	10. Interior Finishes	



# Green Building Inspection Checklist

Plan Check # \_\_\_\_\_

GB Total Points \_\_\_\_\_

For a complete description, see the Green Building Rating Checklist

P= Points M = Mandatory O = Options

Ref #	Green Building Measures	P	M	O	Approval
<b>5/7,8,9 Soil Inspection</b>					
22	Fully Insulate Hot water lines with R-2		X		
<b>14 Strap and Shear</b>					
1.15	Install utility supplied power	1+		<input type="checkbox"/>	
2.9	Insulated wall system Integral/SIP/ICF/AAC	2+		<input type="checkbox"/>	
3.5	Radiant barrier on roof sheathing	1		<input type="checkbox"/>	
13.1	Outside Recycling bins during construction	1+		<input type="checkbox"/>	
<b>15-18/21 Rough Frame Inspection</b>					
5	Seal all penetration in building envelope		X		
7	Install Return Air ducts or transfer grilles in each room with a door		X		
8	Seal all duct joints with water based mastic		X		
9	Supply ducts insulated (R-4.2 in conditioned spaces) (R-8 non conditioned spaces)		X		
10	Refrigerant piping shall be insulated with R-2		X		
12	Install at least (3) ceiling fan boxes		X		
13	Install carbon monoxide detectors		X		
20	I.C. rated lights at insulated ceilings		X		
21	Install task lighting bathroom/kitchen/laundry		X		
4.3	House is wrapped with infiltration barrier	1		<input type="checkbox"/>	
5.15	Central vacuum system vented to the outside	2		<input type="checkbox"/>	
5.16	Exhaust fan in garage minimum of 100 cfm	1		<input type="checkbox"/>	
6.3	Recessed lights do not penetrate barriers	2		<input type="checkbox"/>	
6.6	Install control lighting with smart wiring system.	2		<input type="checkbox"/>	
6.8	Laundry room has gas dryer stub out	1		<input type="checkbox"/>	
6.12	Electrical rough-in for solar panels	2		<input type="checkbox"/>	
7.1	All hot water lines insulated R-4	1		<input type="checkbox"/>	
7.4	Plumbing rough-in on roof, stub out for solar hot water panels	2		<input type="checkbox"/>	
7.5	Hot water circulation loop	2		<input type="checkbox"/>	
7.6	Water Central Manifold Distribution System	2		<input type="checkbox"/>	
7.10	Two-pipe drain system for gray water	2+		<input type="checkbox"/>	
8.7	Continuous ridge vent and vented eaves	2		<input type="checkbox"/>	



# Green Building Certificate of Compliance

## Self-Certified Checklist Items

Residential (single and multiple single-family dwellings per IRC)

Instructions: The certification section of this form is to be signed by the Building Permit Holder and submitted to the building inspector at the time of Final Inspection. The Permit Holder is responsible for all mandatory green building measures and selected options as indicated on this form.

Plan Check # \_\_\_\_\_ Building Permit # \_\_\_\_\_ GB Total Points \_\_\_\_\_

Project Address \_\_\_\_\_

For a complete description of checklist items and point options, see the Green Building Rating Checklist.

**P** = Points    **M** = Mandatory    **O** = Selected Options

Checklist Ref. No.	Green Building Measures	P	M	O
<b>Site</b>				
2	At least 80% of landscaping is Xeriscape or native.		X	
<b>Indoor Environmental Quality</b>				
15	Install air filters with a min. MERV rating of 8. Ensure that air handlers can maintain adequate pressure and air flow <u>OR</u> install a ductless space conditioning system.		X	
18	Seal off ducts during construction <u>OR</u> clean HVAC ducts, coils and blower fan before occupancy.		X	
<b>Lighting</b>				
19	At least 50% of interior wall surfaces are colored with a minimum Light Reflective Value (LRV) of 40%. At least 50% of interior ceiling and soffit surfaces are colored with a minimum LRV of 70%. ("off white" finish has a 70% LRV).		X	



# Green Building Certificate of Compliance

## Self-Certified Checklist Items

Residential (single and multiple single-family dwellings per IRC)

Structural Elements				
2.1	Non-asphalt based damp proofing is used for basement and/or retaining wall applications (e.g. zero VOC/water based liquid acrylic, 1 ply membrane, bentonite clay, and cement-based waterproof coating).	2		<input type="checkbox"/>
2.2	Western coal fly ash is used in all concrete foundations and slabs with min. 20% substituted volume of cement.	1		<input type="checkbox"/>
2.4	At least 75% of roof structure lumber is certified by the Forest Stewardship Council (FSC) as a sustainable source.	2		<input type="checkbox"/>
	<u>Additional Points</u> for at least 75% of floor structure	2		<input type="checkbox"/>
	<u>Additional Points</u> for at least 75% of beams, headers and columns	2		<input type="checkbox"/>
	<u>Additional Points</u> for at least 75% of interior framing	2		<input type="checkbox"/>
2.8	Low toxic materials with no urea-formaldehyde resin are used for all sub-floor, roof and wall sheathing.	2		<input type="checkbox"/>
2.9	An integral wall system is used that combines structural and thermal properties, and/or finish.			<input type="checkbox"/>
	<u>Additional Points</u> for regionally extracted or recovered, processed and manufactured within 500 miles	2		<input type="checkbox"/>
	<u>Additional Points</u> for regionally extracted or recovered, processed and manufactured within 250 miles	4		<input type="checkbox"/>
2.10	Structural products (other than those for walls) from regional manufacturers within 250 miles (e.g. beams lintels, headers, columns). This item does not include concrete slabs on grade or conventional wood trusses)			<input type="checkbox"/>
	<u>1 pt. per category (max. 2 pts.)</u>			





# Green Building Certificate of Compliance

## Self-Certified Checklist Items

Residential (single and multiple single-family dwellings per IRC)

Energy Rating/Performance				
3.2	Participate in a third-party Energy Certification Program such as EPA Energy Star Home, Environments for Living, Build America or Utility Company Programs List name of program –	3		<input type="checkbox"/>
3.3	An Energy Usage Guarantee is provided by builder or third-party energy performance provider.	3		<input type="checkbox"/>
Thermal Envelope				
4.4	Perform a third-party building envelope air leakage (blower door) test with less than or equal to 0.35 air changes per hour (0.35 CFM at 50 Pascal's pressure per sq. ft. or less). Additional Points for less than or equal to 0.25 air changes per hour	4		<input type="checkbox"/>
		2		<input type="checkbox"/>
4.5	Wood windows or wood clad windows are certified by the Forest Stewardship Council (FSC) or windows made from non-wood materials.	2		<input type="checkbox"/>
4.6	Wood windows or wood clad windows are certified by the Sustainable Forest Initiative (SFI).	1		<input type="checkbox"/>
4.15	Insulation has a minimum of 25% recycled content (e.g., cellulose, denim).	2		<input type="checkbox"/>
4.16	Dwelling is insulated with formaldehyde-free insulation.	2		<input type="checkbox"/>





# Green Building Certificate of Compliance

## Self-Certified Checklist Items

Residential (single and multiple single-family dwellings per IRC)

### Heating, Ventilation, and Air Conditioning

5.4	Perform a duct leakage test measured in CFM at 25 Pascal's pressure with equal to or less than 3% of the floor area served by each unit, or equal to or less than 5% of the fan flow at high speed for each system installed.	4		<input type="checkbox"/>
5.5	Design and install a whole building ventilation system as specified in Table 4.1a of ASHRAE Standard 62.2 or at a rate of 15 CFM for the master bedroom, 7.5 CFM for additional bedrooms and 0.01 CFM for each square foot of total conditioned floor area. The system shall operate automatically or continuously with manual override as part of an energy recovery ventilator or balanced exhaust/supply fan system.	4		<input type="checkbox"/>
5.18	Bathroom exhaust fans are operated by an occupant sensor, automatic humidistat controller, or timer for either a timed interval or until humidity level is reduced.	2		<input type="checkbox"/>
5.19	Test for radon and if radon level is 2 pCi/L (pico Curies per Liter) or more, install a radon ventilation system per Environmental Protection Agency (EPA) guidelines	3		<input type="checkbox"/>



# Green Building Certificate of Compliance

## Self-Certified Checklist Items

Residential (single and multiple single-family dwellings per IRC)

### Electrical Power, Lighting, and Appliances

6.1	Interior floor covering is light in color, with a minimum light reflectance value (LRV) of 25%.	1		<input type="checkbox"/>
6.4	At least 50% of lighting fixtures have an efficacy of 40 lumens per watt (l/w) or more. High-efficacy lighting includes compact or tubular fluorescent and light-emitting diodes (LEDs).	2		<input type="checkbox"/>

### Plumbing System

7.8	All bathroom faucets and showerheads are high efficiency (2.0 or less GPM).	3		<input type="checkbox"/>
7.9	A <u>Point of Use</u> water treatment system is installed that meets applicable NSF/ANSI Standards (#42, #53, #55) with a treated water recovery rate equal to at least 70% of water intake.	2		<input type="checkbox"/>
	<u>OR</u> A <u>Point of Entry</u> water treatment system is installed that meets applicable NSF/ANSI Standards (#42, #53, #55) with a treated water recovery rate equal to at least 70% of water intake	3		<input type="checkbox"/>

### Roofing

8.1	A minimum of 25% of the roofed area uses recycled or recycled content roof material (e.g. metal, rubber, or salvaged roof tiles).	2		<input type="checkbox"/>
	<u>Additional Point</u> for 50% of the roofed area meets the criteria.	1		<input type="checkbox"/>
8.6	Roof covering has min. 35-year manufacturer's warranty or otherwise uses bitumen underlayment or equivalent material (e.g., 90 lb. underlayment) under concrete, clay, or slate roofing materials.	2		<input type="checkbox"/>



# Green Building Certificate of Compliance

## Self-Certified Checklist Items

Residential (single and multiple single-family dwellings per IRC)

### Exterior Finishes

9.1	Exterior finishes are derived from regional sources within 500 miles of jobsite. This includes stone or cultured stone veneers that are regionally quarried or processed.	1		<input type="checkbox"/>
9.2	Dwelling uses reconstituted or recycled-content siding (minimum 50% pre-or post-consumer).	1		<input type="checkbox"/>
9.4	Stucco or siding material is integrally colored.	1		<input type="checkbox"/>
9.6	Fascia, soffit and trim elements are made of recycled-content materials or engineered wood products such as finger jointed trim, fiberboard, laminated strand lumber or OSB.	1		<input type="checkbox"/>

### Interior Finishes

10.1	Wallboard used in the home is made with min. 25% recycled content, such as wheat board with agricultural by-products or gypsum board with industrial by-product gypsum or flue-gas waste product.	2		<input type="checkbox"/>
10.2	Adhesives used for installation of materials such as drywall, paneling, carpet, wood flooring, ceramic or VCT tile, cove base, etc., contain a maximum VOC (volatile organic compound) content of 100 grams/liter.	2		<input type="checkbox"/>
10.3	Interior paints, coatings and primers contain zero VOC's or meet Green Seal Standard GS-11 limits of 150 grams/liter for non-flat paints and 50 grams/liter for flat paints past pigment addition.	2		<input type="checkbox"/>
10.4	Interior paints contain no acetone, formaldehyde or ethylene glycol.	2		<input type="checkbox"/>
10.5	Interior paints and finishes contain a minimum of 20% recycled content.	2		<input type="checkbox"/>



# Green Building Certificate of Compliance

## Self-Certified Checklist Items

Residential (single and multiple single-family dwellings per IRC)

### Interior Doors, Cabinetry, and Trim

11.1	All solid wood doors are domestic hardwoods or certified by the Forest Stewardship Council (FSC).	2		<input type="checkbox"/>
11.2	All solid wood doors are certified by the Sustainable Forest Initiative (SFI).	1		<input type="checkbox"/>
11.3	No composite doors used or composite doors are made from non-toxic binders (no added formaldehyde).	2		<input type="checkbox"/>
11.4	Casework for cabinets, counters and other built-in furniture is formaldehyde free.	2		<input type="checkbox"/>
11.5	All exposed substrate materials containing formaldehyde, such as the inside of cabinets and the underside and edge of counters, are sealed with a water-based formaldehyde blocking finish.	2		<input type="checkbox"/>
11.6	Casework is domestic hardwood, from a <u>FSC</u> (Forest Stewardship Council) certified sustainable source, and/or is a rapidly renewable material (a material that re-generates itself within a ten year period).	2		<input type="checkbox"/>
11.7	Casework is from a <u>SFI</u> (Sustainable Forest Initiative) certified sustainable source.	1		<input type="checkbox"/>
11.8	All interior trim is finger-jointed/engineered wood, domestic hardwood, from an FSC- or SFI- certified sustainable source, is a rapidly renewable material, or contains recycled content.	1		<input type="checkbox"/>
11.9	Cabinets are pre-finished off-site <u>OR</u> are finished on-site with a product that contains a maximum VOC content of 350 grams/liter.	1		<input type="checkbox"/>
11.10	Countertops are manufactured from recycled content material.	1		<input type="checkbox"/>
11.11	Countertops are made from concrete or regionally processed or quarried stone or tile from within 500 miles of job site.	1		<input type="checkbox"/>
11.12	No tropical woods are used in the entire home.	1		<input type="checkbox"/>
11.13	No wood base, cove, crown molding, door or window trim is used in the entire home, unless it is recycled or salvaged material.			<input type="checkbox"/>



# Green Building Certificate of Compliance

## Self-Certified Checklist Items

Residential (single and multiple single-family dwellings per IRC)

Flooring				
12.1	Carpeting and padding certified under the Carpet and Rug Institute's Green Label Plus program.	1		<input type="checkbox"/>
12.2	Recycled content (e.g., carpet, pad, tile) or salvaged (e.g., reclaimed wood) flooring.	1		<input type="checkbox"/>
12.3	Flooring is made from a rapidly renewable material (bamboo, linoleum, cork, wool or other materials that are regenerated within a 10-year cycle).	2		<input type="checkbox"/>
12.4	Flooring is from a <u>FSC</u> (Forest Stewardship Council) certified sustainable source.	2		<input type="checkbox"/>
12.5	Flooring is from a <u>SFI</u> (Sustainable Forest Initiative) certified sustainable source.	1		<input type="checkbox"/>
12.6	Stone or tile flooring that is quarried, processed and/or made within 500 miles of site.	1		<input type="checkbox"/>
12.8	Carpeting is used on less than 25% of conditioned floor area. Additional Point for no carpeting used at all.	2		<input type="checkbox"/>
		1		<input type="checkbox"/>
Solid Waste				
13.1	Project includes separate recycling bins during construction for diverting materials from the landfill including cardboard, wood, drywall, foam, metal, concrete, masonry, tile, asphalt. <u>1 pt. for each item</u> recycled by builder or waste hauler			<input type="checkbox"/>



# Green Building Certificate of Compliance

## Self-Certified Checklist Items

Residential (single and multiple single-family dwellings per IRC)

1 pt. for each item recycled by builder or waste hauler

### CERTIFICATION OF COMPLIANCE (to be completed and submitted at Final Building Inspection)

By affixing my signature below, the undersigned does hereby declare and affirm to the City of Scottsdale that all of the selected green building checklist items, as specified on the city approved plans and green building rating checklist, have been met for the indicated points and will, if audited, provide the necessary supporting documents (specs, test results, photos, homeowner's manual, etc.).

<b>Responsible Party</b> (building permit holder)	<b>Date</b>	
	<b>Printed Name</b>	
	<b>Title</b>	
	<b>Company Name &amp; Phone Number</b>	
	<b>Signature</b>	

# Mandatory Measures





# Mandatory Measures

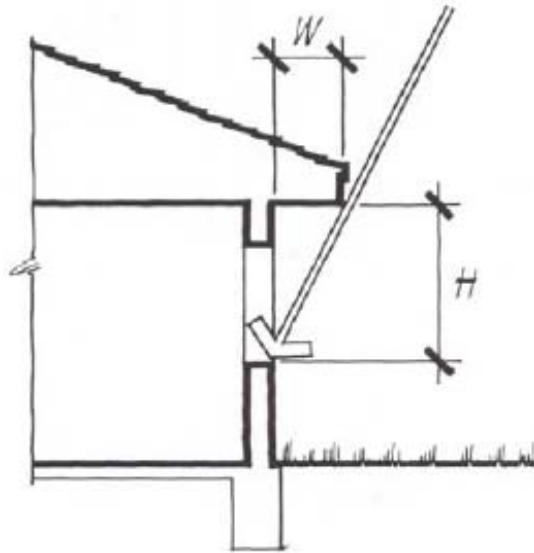
## ■ Site

- Protect all exterior entrances from direct summer sun exposures (east, west, south)
  - recessed or covered entry
- Native or Xeriscape landscape





# Overhang Dimensions



Roughly appropriate overhang dimension W can be calculated by selecting the shade line factor (SLF) from the table below and inserting in the formula:

$$W \text{ (overhang dimension)} = H / \text{SLF}$$

Shade Line Factors (SLF) for Phoenix region (latitude 33.5°)	
Window Faces	Shade Line Factor
East	0.8
Southeast	1.4
South	3.6
Southwest	1.4
West	0.8

Size & spacing of shading elements is a function of the orientation, time of day & year.



Porch Entries





## Recessed Entrances





**Trellis Entry**







**Courtyard Entry**



**Arcade Entry**



## Louvers & Trellis





Movable shading at west elevation of remodel home

# Mandatory Measures

- Energy Efficiency
  - Building must be designed to be at least 15% above IECC (International Energy Conservation Code) OR meet Energy Star for Homes standard



**REScheck**

[www.energycodes.gov](http://www.energycodes.gov)



[www.energystar.gov](http://www.energystar.gov)



# Mandatory Measures

- Energy Efficiency
  - Insulated ductwork
  - Return air paths



# Mandatory Measures

- Energy Efficiency
  - Ceiling fans
  - Programmable thermostat



# Mandatory Measures

## ■ Indoor Environmental Quality

- Carbon monoxide (CO) detectors
- Energy Star Exhaust fans with air flow rate per ASHRAE Std. 62.2



# Mandatory Measures

- Indoor Environmental Quality
  - Supply air filtering per MERV 8
  - Kitchen and bathroom min. exhaust rate
  - Seal off ducts during construction



Bathroom exhaust



Pleated filter

# Mandatory Measures

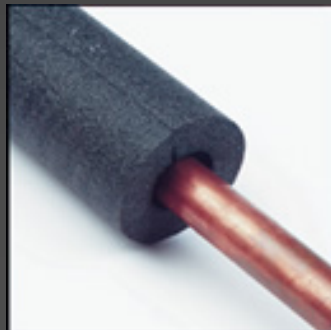
- Lighting
  - Light Reflective Value (LRV)
  - Task lighting





# Mandatory Measures

- Plumbing
  - Insulated hot water lines
  - On demand hot water recirculation system
  - High efficiency toilets



# Mandatory Measures

- Interior Finishes
  - Low VOC paints and finishes
- Solid Waste
  - Built-in kitchen recycling center



# Mandatory Measures

- Homeowner's manual
  - green certificate of occupancy
  - self-certification certificate
  - manufacturer's manuals
  - info on the efficient operation of HVAC system, lighting and water-using appliances and fixtures





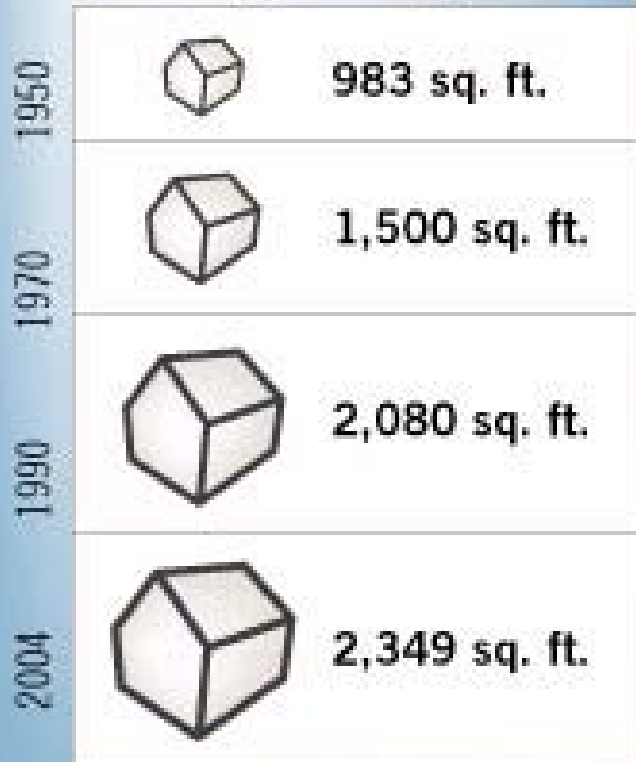
# House Size Adjustment

- Small House gain points
  - Plus 1 Point for every 100 sq. ft. under 3000 sq. ft.
- Large House loses points
  - Minus 1 Point for every 250 sq. ft. over 3500 sq. ft.

# National House Size Growth

## From Modest to McMansion

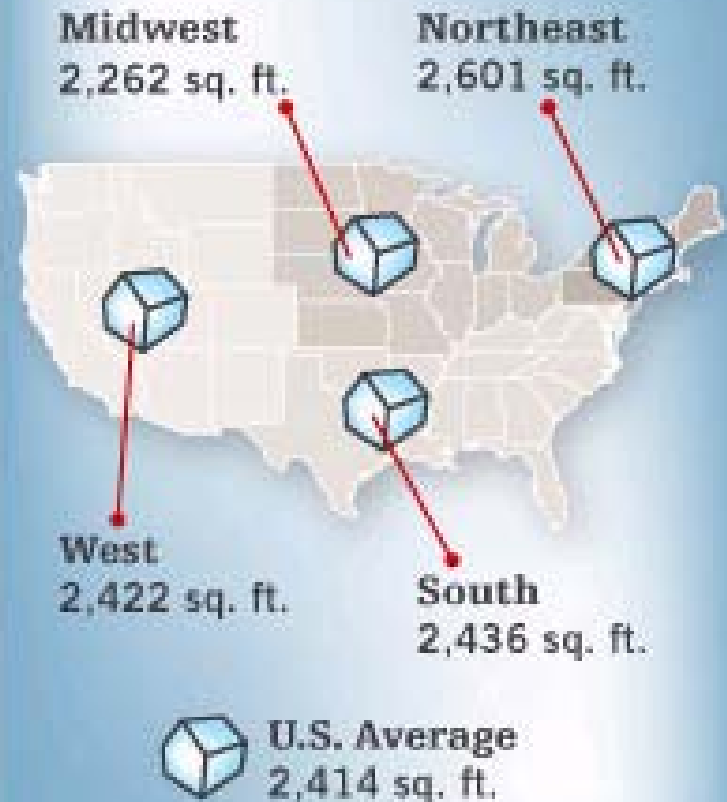
The average square footage of a new single-family home



Source: National Association of Home Builders (Housing Facts, Figures and Trends for March 2006)

Doug Beach for NPR

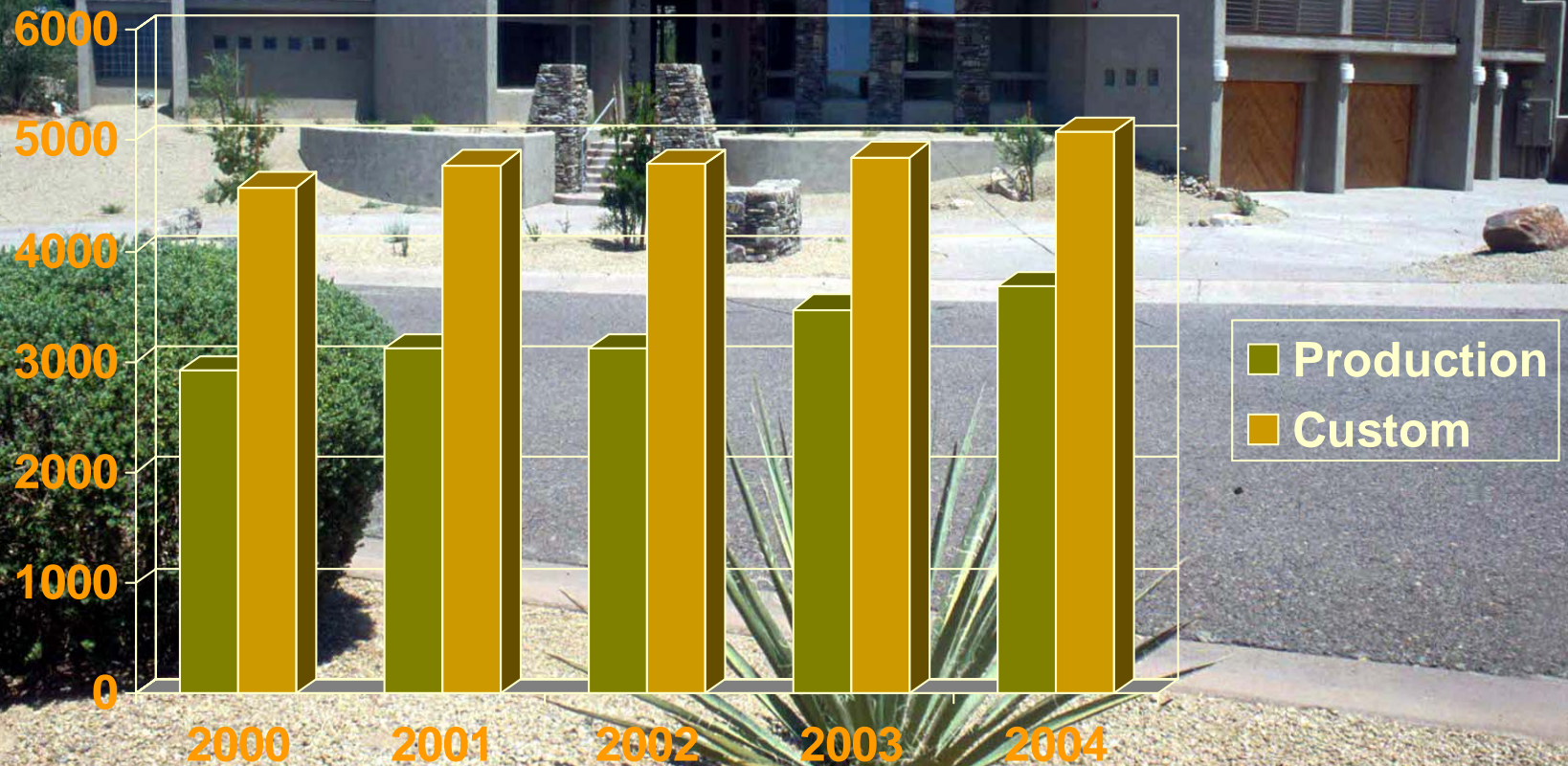
## The Average Size of a New Home by Region: 2005



Source: National Association of Home Builders

Doug Beach for NPR

# Scottsdale House Sizes



# LEED for Homes Rating Checklist

## Points for Home Size

House Size In Square Feet (By Number of Bedrooms)					Score
0 Bedrooms	1 Bedroom	2 Bedrooms	3 Bedrooms	4 or More Bedrooms	
300	550	800	1000	1150	<b>10</b>
380	610	920	1180	1450	<b>8</b>
460	670	1040	1360	1750	<b>6</b>
540	730	1160	1540	2050	<b>4</b>
620	790	1280	1720	2350	<b>2</b>
<b>700</b>	<b>850</b>	<b>1400</b>	<b>1900</b>	<b>2650</b>	<b>0</b>
780	910	1520	2080	2950	<b>-2</b>
860	970	1640	2260	3250	<b>-4</b>
940	1030	1760	2440	3550	<b>-6</b>
1020	1090	1880	2620	3850	<b>-8</b>
1100	1150	2000	2800	4150	<b>-10</b>
>1100	>1150	>2000	>2800	>4150	<b>etc.</b>

House sizes based on from national average.

# Rating Options





# 1. Site Use

- Credit for Multi-Family Housing
  - Dwelling has one or two shared common walls
  - Duplex, townhomes or condominiums



# Outdoor Living Spaces

- Create shade while letting air and rain pass through
  - Open weave fabric
  - Trellis, arbor
  - Removable/retractable shade structured







## Maximizing Shade for Outdoor Living







Courtyards and  
Tree canopies



# 3. Thermal Envelope

- Higher Energy Rating
  - Building must be designed to be at least 30% above IECC (International Energy Conservation Code)
  - Additional points for 50% above IECC



**REScheck**

[www.energycodes.gov](http://www.energycodes.gov)

# 4. HVAC & Indoor Air Quality

- Point options
  - Alternative heating/cooling systems



# 5. Electrical Power, Lighting and Appliances

- Point options
  - Daylighting
  - Non-incandescent lighting





# 5. Electrical Power, Lighting and Appliances

- Point options
  - Solar electric (PV) power system



## 6. Plumbing System

- Point options
  - High efficiency toilets (1.3 or less gal./flush) or dual control flush
  - High efficiency bathroom faucets and shower heads (2.0 or less GPM)



# 10. Interior Doors, Cabinetry, and Trim

## ■ Point options

- Doors and casework is domestic hardwood or from certified sustainable source
- Formaldehyde free casework
- Concrete or regionally quarried and processed stone countertops



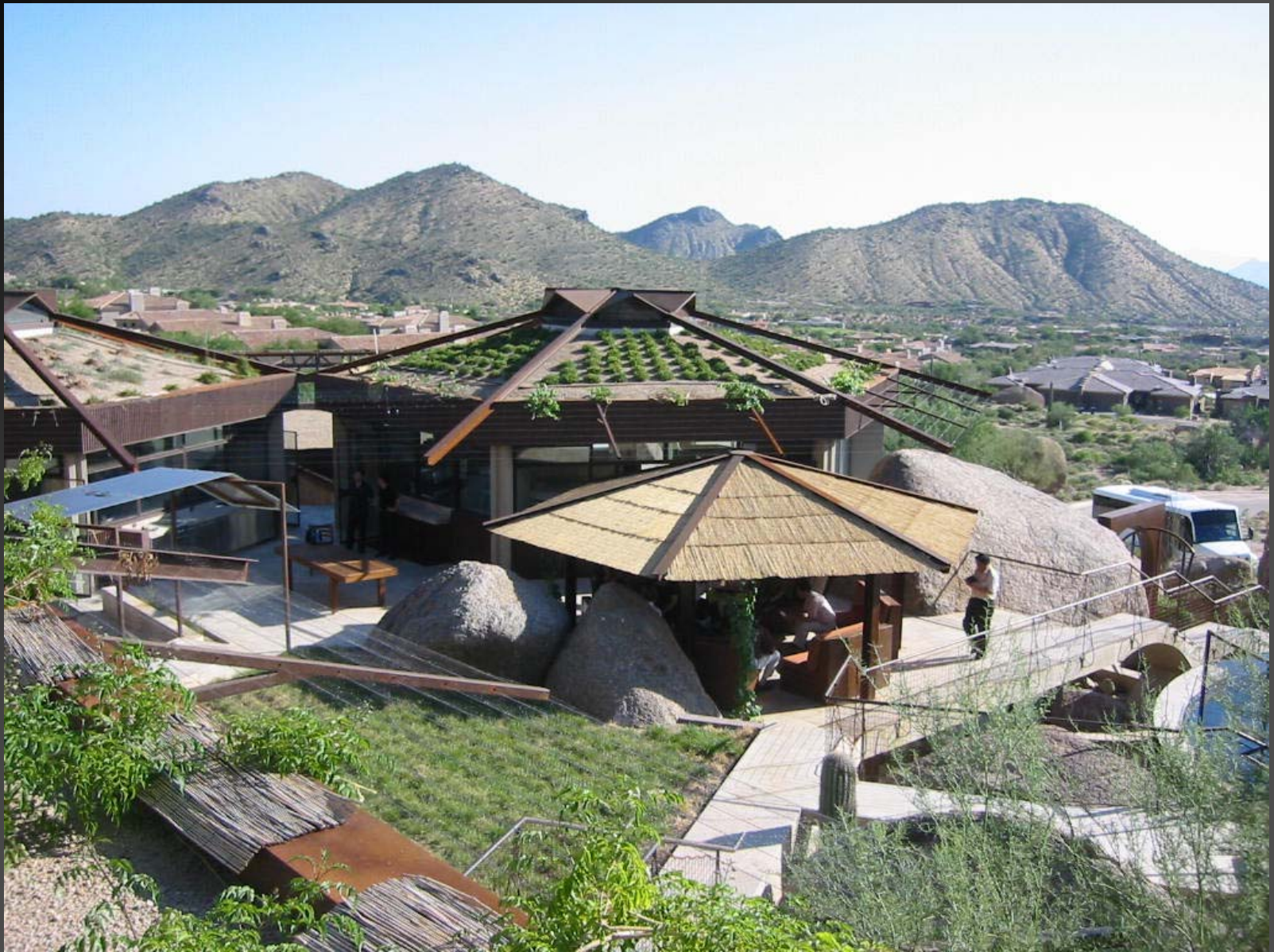
# 12. Solid Waste

- Point options
  - Separate recycling bins for construction waste
  - Allocated area for city recycling containers





# Scottsdale Projects



Beaulieu Residence  
Green Hydrogen House





Hovey Residence  
Building Integrated PV





Foster Residence  
Autoclaved Aerated Concrete  
Edwards Design Group



Foster Residence – Daylighting, Solar Power, Framing  
Edwards Design Group





Strata International – Saebi Alternative Building System

# Green Home Remodeling



- Project guide
  - Site Use & Landscaping
  - Energy Efficiency & Renewables
  - Indoor Environmental Quality & Health
  - Water & Resource Efficiency
  - Project Types





McDonnell Residence  
Remodel and Addition

## McDonnell Residence Remodel and Addition

### Daylighting and Solar Control









# City Resolution

- All new, occupied city buildings shall be designed, contracted and built to achieve the LEED™ Gold certification level.
  - where the payback is anticipated to be more than five (5) years, City staff is directed to recommend to the City Council which level of LEED™ certification is appropriate for that particular project.



# Scottsdale Senior Center



Scottsdale's 1<sup>st</sup> LEED Gold city facility



Solar Canopy Installation on April 9, 2006  
Scottsdale Senior Center



# Pipeline for LEED Gold Projects

- Arabia Library (LEED Silver)
- Police Forensic Lab (LEED Silver)
- Police District Station 1
- Fire Station No. 2
- Civic Center Office Building
- Westworld Exhibit Hall
- Scottsdale Center for the Performing Arts Interior Remodel (LEED Silver)





Preliminary Design  
Scottsdale Fire Station No. 602

# New Developments

- Green commercial guidelines for private development
  - Sonoran Desert context

## Scottsdale Pilot Program

City of Scottsdale

### Commercial Green Building Checklist New Construction and Major Renovation

*Based on 2001 Pilot Program*

This checklist is designed to be a commercial counterpart to the Scottsdale Residential Green Building Program rating checklist. It is prescriptive-based and intended to address the local issues of Scottsdale in the regional context of the Sonoran Desert. Inspections, verification and certification will be administered by the city. There are four rating levels: <u>Level 1</u> - Meet all prerequisites of checklist items; <u>Level 2</u> - acquire 25 - 49 % of checklist items; <u>Level 3</u> - acquire 50 - 74% of checklist items; <u>Level 4</u> - acquire 75% or more of checklist items.		Documentation Required	Select Items	
<b>1 - SUSTAINABLE SITES</b>				
<b>1.1 Site Selection &amp; Disturbance</b>				
Prerequisites: <ul style="list-style-type: none"><li>* Stormwater management per Scottsdale ordinance.</li><li>* Scottsdale Environmentally Sensitive Lands Ordinance.</li><li>* General Plan conformance.</li><li>* Dust control per Maricopa County regulations.</li></ul>				



Optima Camel View Village  
Largest Scottsdale Green Building Project  
11 buildings - 750 residential units - 38,000 sq. ft. retail





Optima Camel View Village  
Under construction – April 15, 2006



Safari Drive  
Scottsdale Green live/work mixed-use village





Hayden Array  
Modus Development – merz project



# Future Outlook

- Updated Rating and Inspection Process – Sept. 2006
- New Code Adoption – Jan. 2007
- Mandatory Items
- Voluntary with Incentives



[www.scottsdaleaz.gov/greenbuilding](http://www.scottsdaleaz.gov/greenbuilding)